GEOTECHNICAL DESIGN REPORT
REGNART CREEK BANK STABILIZATION
NOVEMBER DRIVE AND FESTIVAL DRIVE
CUPERTINO, CALIFORNIA

PROJECT NO. 20150225.006A

FEBRUARY 29, 2016

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A Report Prepared for:

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REGNART CREEK BANK STABILIZATION
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CUPERTINO, CALIFORNIA

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GEOTECHNICAL DESIGN REPORT
REGNART CREEK BANK STABILIZATION
NOVEMBER DRIVE AND FESTIVAL DRIVE
CUPERTINO, CALIFORNIA

1.0 INTRODUCTION

1.1 INTRODUCTION

This report presents the results of our geotechnical investigation and engineering analysis for the creek bank stabilization project along an approximately 100 to 150-foot long section of the north bank of Regnart Creek, in Cupertino, California. The report includes reinforced soil slope design parameters and construction considerations for the stabilization of the creek bank. This report is limited to stabilization of the creek bank and does not address future channel restoration requirements at the project site. The project location is presented on Figure 1, Site Location.

1.2 PROJECT DESCRIPTION

An approximately 100 to 150-foot long section of the north bank of Regnart Creek has experienced severe erosion, resulting in vertical to near-vertical banks as shown on Figure 2. According to photos furnished by the District, the creek bank has been undergoing erosion and shallow slumping since at least 2008. The affected segment of creek is located across the street from the property at 1118 November Drive, in Cupertino, California. Based on visual observations made during a December 22, 2015 site meeting with the District, the creek is roughly 10 to 12 feet deep at the proposed project location. Within the creek channel, we observed locations at which the channel is undercut by several inches. Mature trees and other vegetation are common on the creek banks as well as within the channel.

1.2 PURPOSE AND SCOPE

The purpose of our work is to provide geotechnical information to the District regarding design parameters and construction considerations for the creek bank stabilization within the extent of the existing eroded banks utilizing a reinforced soil slope (RSS) design. After consideration of other repair alternatives, including gabions and a soldier beam and lagging wall, the District selected the RSS alternative as the most desirable approach.

Our scope of services includes a subsurface investigation, laboratory testing, selection of slope stability and RSS design parameters, and preparation of this report.

The creek bank restoration at the toe of the reconstructed slope as well as protection of the slope face will be designed by others based on hydraulic flow requirements, maintenance considerations, and aesthetic goals of the District. Once the specific channel restoration design and erosion protection measures have been selected Kleinfelder should review the final design approach for compatibility with the geotechnical recommendations provided herein.

The conclusions and recommendations presented in this report are based on the data acquired and analyzed during this study. This report is intended to provide information and recommendations for the mitigation of the subject creek bank at the specific location noted and is not intended to provide mitigation for other instabilities at other locations. The conclusions and recommendations presented herein supersede those presented in previous correspondence between Kleinfelder and the District.

1.3 AUTHORIZATION

This investigation is authorized by Task Order No. 6 under Standard On-Call Consulting Agreement – Contract No. A3711A between the Santa Clara Valley Water District and Kleinfelder.

2.0 SUBSURFACE EXPLORATION

Our subsurface exploration was performed on January 8, 2016, and consisted of drilling one boring (B-1) at the location shown on Figure 3. The boring location was located in the field by Kleinfelder's representative by measuring from existing site features. The subsurface exploration was conducted under the direction of our field engineer.

Under subcontract to Kleinfelder, Pitcher Drilling of East Palo Alto, California drilled the boring with a truck-mounted Failing 1500 drill rig using a combination of solid-flight auger and mud rotary drilling methods. Boring B-1 was drilled and sampled to a depth of approximately 45 feet below the ground surface.

Samples were obtained from the boring by driving a 2.5-inch (inside diameter) California sampler or Standard Penetration Test (SPT) sampler at selected depths. The sampler was advanced by dropping a 140-pound hammer 30 inches, and the number of blows required to penetrate every 6 inches (or fraction when blows exceeded 50 for 6") was recorded. When the sampler was withdrawn from the boring, the liners containing the samples were removed, examined for logging, labeled and sealed to preserve their natural moisture content for possible laboratory testing. Where the SPT sampler was driven, the soil was examined and classified. The samples were placed in labeled plastic bags, which preserve the natural moisture content.

Kleinfelder's field engineer logged the boring, visually classified the soil encountered according to the Unified Soil Classification System (see Plate A-1 in Appendix A), and obtained samples of the subsurface materials. Soil classifications made in the field from samples and auger cuttings were performed in general accordance with ASTM D2488. These classifications were re-evaluated in the laboratory after further examination and testing in accordance with ASTM D2487. Sample classifications, blow counts recorded during sampling, and other related information was recorded on the boring log. The Unified Soil Classification System and a key to the symbols used on the boring log are both described on Figure A-1 in Appendix A. A Soil Description Key is presented on Figure A-2. The boring log is presented on Figure A-3 in Appendix A.

3.0 GEOTECHNICAL LABORATORY TESTING

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The geotechnical laboratory testing program included the following:

- Unit Weight (ASTM D2937)
- Water Content (ASTM D2216)
- Grain Size Analysis (ASTM D422)
- Unconsolidated Undrained Triaxial Compression, (ASTM D2850)

Geotechnical laboratory testing was performed by Kleinfelder's laboratory facility located in Hayward, California. The laboratory test results are summarized on the boring logs and are presented in Appendix B.

4.0 SITE DESCRIPTION AND SUBSURFACE CONDITIONS

4.1 SITE DESCRIPTION

Regnart Creek is a major tributary for Calabazas Creek in City of Cupertino, California. Regnart Creek flows from southwest to northeast. At the study location the crest of the eroded creek bank slope is currently about 5 feet from the November Drive curb.

Based on the geomorphic features observed in the field and the subsurface conditions encountered in the boring, the erosional feature appears to be a top-down slumping type failure. Undercutting near the bottom of the creek channel was also observed in the eroded area. The eroded area is approximately 100 to 150 feet wide and extends approximately 10 to 15 feet south from the top of the existing bank to the centerline of Regnart Creek. Movement of the slide is predominantly attributed to undercutting and erosion due to scour at the base of the slope within the creek channel.

4.2 SUBSURFACE CONDITIONS

The subsurface conditions consist primarily of interbedded layers of clayey sand and sandy lean clay. Occasional thin layers of sandy and gravelly soils were also encountered. The clayey soils are generally firm to hard, and the sandy and gravelly soils are generally medium dense to very dense. Detailed subsurface conditions are presented on the boring log in Appendix A.

The uncorrected Standard Penetration Test blow counts of the sandy lean clay and clayey sands in our boring exceed 25 blows per foot. In most cases, these soils have blow counts that exceed 30 blows per foot. In our opinion, these soils are too dense to be susceptible to significant strength loss (liquefaction) during or immediately following strong earthquake shaking.

4.3 GROUNDWATER

For purposes of stability and earth pressure analyses, the static groundwater level is taken at the creek channel invert elevation, with flood stage levels that could approach a depth of 6 feet above the channel invert. The 100-year flood elevation was provided by the District.

5.0 SLOPE STABILITY ANALYSIS

Slope stability analysis was performed in general accordance with the "Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Landslide Hazards in California," published by the Southern California Earthquake Center in June 2002 and "Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California", published by CGS in 2008. Analysis for a proposed geogrid reinforced soil slope was based on cross-sectional topography along profile line SL-8 (see Figure 3) and included computing static and seismic factors of safety. Stability analyses were performed using SLIDE V6® by Rocscience. Spencer's method, which satisfies both force and moment equilibrium, was used in our analyses.

5.1 SOIL STRENGTH PARAMETERS

The shear strength parameters of the existing soils were estimated based on laboratory testing, correlations with soil type, and back-calculations of properties necessary to provide equilibrium of the existing slope configuration. The design soil profile and geotechnical design parameters are illustrated on Figure 4.

Sandy clays were modeled with the following drained, or "effective stress" parameters:

- Cohesion: 50 to 200 psf
- Internal angle of friction: 30 degrees
- Total unit weight: 130 pcf

Clayey sands were modeled with the following drained, or "effective stress" parameters:

- Cohesion: 50 psf
- Internal angle of friction: 34 degrees
- Total unit weight: 130 pcf

Engineered fill for the reinforced soil slope was modeled with the following drained, or “effective stress” parameters:

- Cohesion: 50 psf
- Internal angle of friction: 32 degrees
- Total unit weight: 130 pcf

Because of the high porosity of near surface soils, and the assumption that the reconstructed slope will include subdrainage, all analyses were modeled assuming drained or “long-term,” effective stress conditions.

5.2 SEISMIC SLOPE STABILITY PARAMETERS

Seismic slope stability was assessed using a pseudo-static method of analysis. For this type of calculation, DMG Special Publication 117A recommends using a probabilistic seismic hazard analysis with deaggregation to develop input ground motions for analysis of seismic landslide hazards. The 2008 USGS Conterminous US Interactive Deaggregation web site (https://geohazards.usgs.gov/deaggint/2008/) and the USGS U.S. Seismic Design Maps application (http://earthquake.usgs.gov/designmaps/us/application.php) were used to develop the ground motion parameters used for seismic slope stability analysis. Based on a probabilistic seismic hazard deaggregation (Modal Magnitude = 8.0, Modal Distance = 7.3 kilometers, Return Period = 10% in 50 years) and a Peak Ground Acceleration (PGA) of 0.556g an equivalent pseudo static acceleration (keq) of 0.26g (Newmark displacement threshold = 15cm) was calculated.

5.3 RESULTS

5.3.1 Static Slope Stability Analysis

Special publication 117A recommends a static factor of safety 1.5 or greater for deep-seated landsliding and 1.3 or greater for surficial stability (cohesion of soil, c’=0). Analysis of the proposed geogrid reinforced slope reconstruction (Appendix C) predicts a calculated factor of safety of at least 1.6 for deep-seated landsliding involving the crest and the toe. Surficial static factors of safety along the slope face were calculated to be greater than 1.3.

Our analysis also assumes a maximum finished slope gradient of 1.5H:1V, proper installation and maintenance of the subdrain system, and that the geogrid (which meets project specifications) is installed per the manufacturer's recommendations and is installed under the observation of Kleinfelder. Recommendations for the engineered fill to be used in the reinforced soil slope are provided in Section 6 of this report.

5.3.2 Seismic Slope Stability Analysis

DMG Special Publication 117A recommends a factor of safety of greater than or equal to 1.0 when assessing seismic slope stability. Our pseudo-static representation, based on a Newmark displacement threshold value of 15 cm (6 inches), predicts a computed seismic factor of safety of greater than 1.1, which we consider to be adequate.

5.3.3 Rapid Drawdown Stability Analysis

Kleinfelder evaluated stability of the reinforced slope following a rapid drawdown of the 100-year flood. For the rapid drawdown analyses, following the development of a flood-induced transient seepage gradient in the slope, the flood level is brought down rapidly to the elevation of the channel invert. As for the case of static stability analyses described above, slope failures involving shallow, surficial slumps that do not involve significant movement of material from the levee toe and crest were not evaluated in our analyses.

The total stress parameters used in the rapid drawdown analyses are illustrated on the rapid drawdown analysis result illustrated in Appendix C. For the rapid drawdown condition we computed a safety factor of at least 1.4, which we consider to be adequate. In general, a computed safety factor of 1.1 is considered adequate by USACE for rapid drawdown conditions.

5.3.4 Results Summary

The results of the analyses described previously are presented in Appendix C and are summarized in the following table:

Slope Stability Analysis Results			
Scenario Description	**Minimum Calculated Factor of Safety (Surficial)**	**Minimum Calculated Factor of Safety (Deep)**	**Minimum Recommended Factor of Safety (Surficial/Deep)**
Static analysis, geogrid reinforced configuration	>1.3	1.6	1.3/1.5
Seismic analysis, geogrid reinforced configuration	>1.0	1.1	1.0
Rapid Drawdown analysis, geogrid reinforced configuration	--	1.4	1.1

6.0 RECOMMENDATIONS

This section presents our recommendations for the stabilization and reconstruction of the creek bank with a reinforced soil slope.

6.1 GENERAL

It is our understanding that the District's preferred method of creek bank stabilization is the use of geogrid-reinforced slope. Slope construction will include removal of loose material and debris and excavation into firm, in-place soil. The excavation should be backfilled as a drained, geogrid reinforced, compacted engineered fill.

The compacted fill should be reinforced primarily with layers of uniaxial geogrid (Tensar UX1100HS or approved equivalent), placed vertically at 1.5-foot intervals. This is illustrated on the Reinforced Soil Slope (RSS) And Drainage Detail on Figure 5. The cross section presented in the detail is schematic and is intended for illustration only.

6.2 SITE PREPARATION

Prior to general site excavation, any vegetation or debris, should be removed from the site. All utilities within the construction area should be protected, relocated, or properly abandoned. Active utilities to be re-used should be relocated outside of the reinforced slope area.

6.3 EXCAVATION

Following site preparation, existing soils should be excavated down to firm and unyielding soil. A base toe keyway should be constructed at the future toe of the slope that is at least 6-feet-wide and is excavated at least 2 feet below the surface of firm, in-place soil. The actual depth of excavation should be determined in the field by a Certified Engineering Geologist/Geotechnical Engineer.

Benching the backcut into competent soil should be performed as shown on Figure 5 and in accordance with Cal OSHA requirements. If any temporary vertical excavations are planned, the contractor should be prepared to submit a detailed shoring plan for the excavation that is designed in accordance with the Cal OSHA Trench Shoring Requirements for the appropriate Soil Type. The shoring design should include calculations, stamped by a California Registered Engineer.

6.4 FILL MATERIAL

Engineered fill for use in the soil reinforced slope should be nearly free of organic materials, debris, or other deleterious substances and have a maximum particle size less than 3 inches in maximum dimension. Specific requirements for engineered fill, as well as applicable test procedures to verify material suitability are provided below.

TABLE 6.1
Engineered Fill Requirements

Fill Requirement		**ASTM[1]**
Gradation		**Test Procedure**
Sieve Size	**Percent Passing**	
3 inch	100	C136
¾ inch	70-100	C136
No. 200	50-70	C136
Plasticity Index		
Plasticity Index (min)	**Plasticity Index (max)**	
8	20	D4318

Notes: 1. American Society for Testing and Materials Standards (latest edition)

6.5 FILL PLACEMENT and COMPACTION

Fill should be compacted in horizontal lifts that are no more than 8 inches in loose thickness. Fill should be compacted to a minimum of 95 percent relative compaction at a minimum of 2% above optimum moisture content. Relative compaction is the in-place soil dry density expressed as a percentage of the laboratory standard described by ASTM D1557. Backfill shall be placed, spread, and compacted in such a manner to reduce the development of wrinkles and/or displacement of the geosynthetic reinforcement.

Grading operations may require provisions for adding moisture to the soil prior to compaction.

6.6 EROSION PROTECTION

It is our understanding that the design of slope erosion protection, including any special protection at the slope toe, will be provided by the District.

6.7 SUBDRAINAGE

To provide drainage, the reinforced slope should be constructed with subdrains as shown on Figure 5. The perforated subdrain pipe should be connected to a solid PVC outlet pipe with an appropriate discharge point. Drain pipe should be constructed to flow at a minimum gradient of 1% and should also be outfitted with an appropriate number of clean-out standpipes to facilitate maintenance. Gravel drainage layers should consist of a minimum three-foot thickness of approved drain rock. All drain rock should consist of Caltrans Class 2 Permeable material or angular drain rock meeting the following specifications:

Sieve Size	Percentage Passing
1½″	100%
½″	Less than 5%

If angular drain rock is used, it should be separated (wrapped) from native soils by a drainage geotextile/filter fabric (Mirafi 140N or equal).

Drainage facilities should be checked annually to confirm that all components are functioning as designed and that there is no damage or blockage to the various components of the system.

6.8 SURFACE DRAINAGE

Surface drainage should be designed to slope to appropriately designed in-take and outfall facilities. The design of drainage facilities is outside the scope of this report.

6.9 GEOGRID PLACEMENT

Geogrid should be placed in accordance with the manufacturer’s guidelines and under the direction of a qualified geotechnical engineer. Geogrid should be spaced as shown schematically on Figure 5. Geogrid reinforcement should not be spliced but should be placed as a single piece.

7.0 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

The creek channel and surrounding environment is dynamic and subject to changes that could occur rapidly due to storm-related events and channel maintenance. This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than five years from the date of the report. If the conclusions and recommendations in this report are to be referenced for design modifications after two years from the report date, the creek channel and slope conditions should be reviewed to verify that no significant changes to the site conditions have occurred due to external environmental factors.

If Client does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations.

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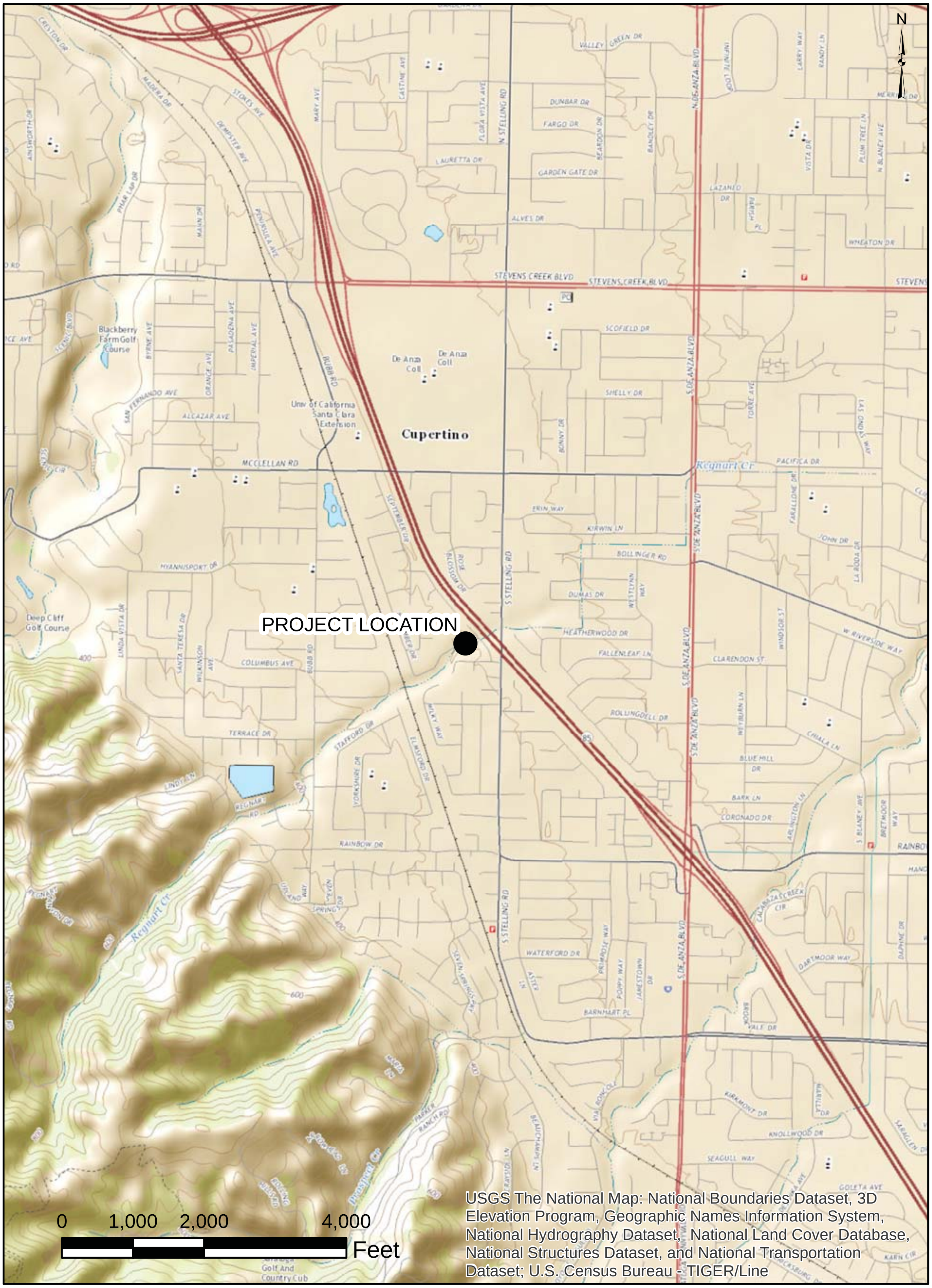
Figures



USGS The National Map: National Boundaries Dataset, 3D Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line

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Santa Rosa

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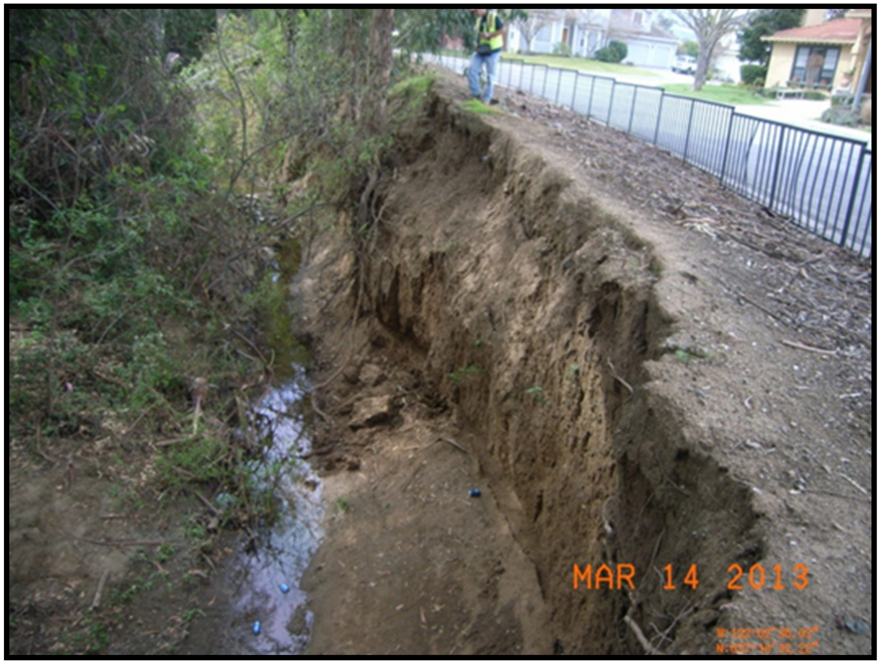
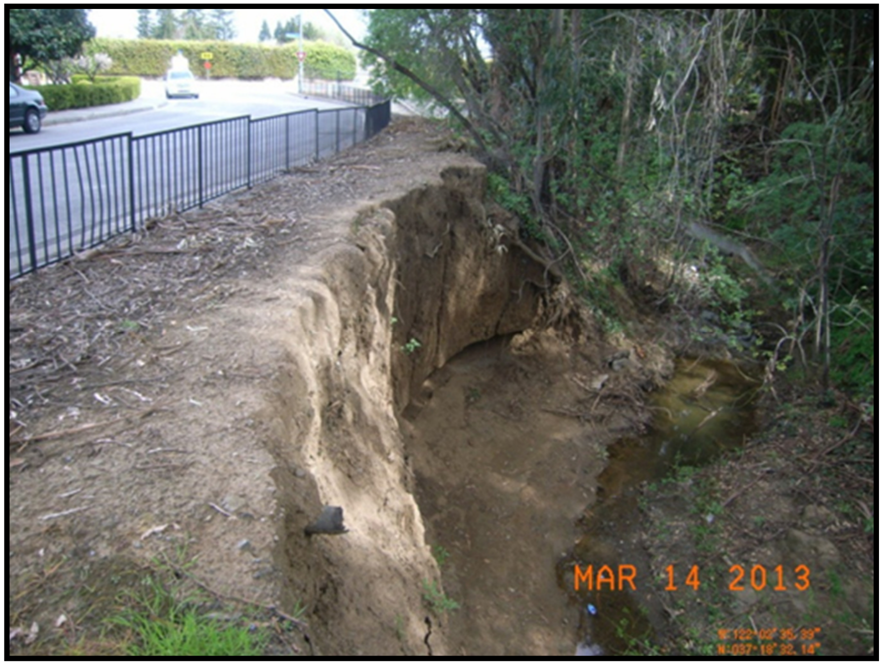
SITE LOCATION

REGNART CREEK STABILIZATION PROJECT
CUPERTINO, CALIFORNIA

FIGURE
1





Facility Name: Regnart Creek

Facility Number: 2017

Photo ID: 42508

Date Taken: 14-MAR-2013

Rating: D(Requires Corrective Action)

DS Station: 113+45

US Station: 113+45

Facility Name: Regnart Creek

Facility Number: 2017

Photo ID: 42509

Date Taken: 14-MAR-2013

Rating: D(Requires Corrective Action)

DS Station: 113+45

US Station: 113+45

Source: Santa Clara Valley Water District, provided by Karl Neuman via email December 21, 2015.

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CHECKED BY:	E. Johnson
FILE NAME:	Plate 2 Site Photo.pub

CREEK BANK EXISTING CONDITIONS

Regnart Creek Bank Stabilization Project
Santa Clara Valley Water District
Cupertino, California

PLATE
2

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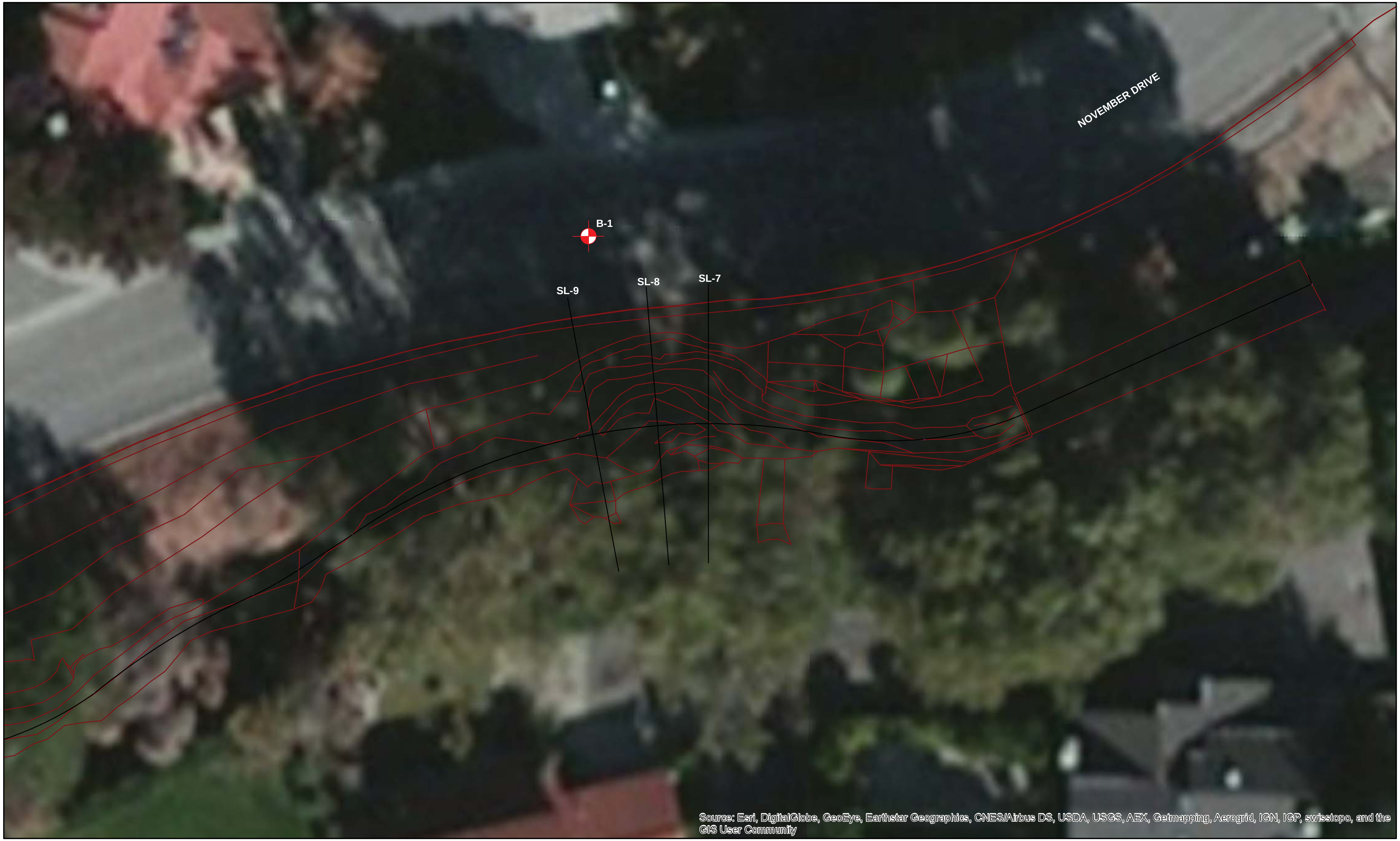
Oakland



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Topographic Source: Regnart Creek_TOPO Surface Fall 2015_SH_-sections2.dwg, provided by Santa Clara County Water District

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⊕ B-1 Boring Location

20 10 0 20

APPROXIMATE SCALE (feet)

N

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SITE PLAN

REGNART CREEK BANK STABILIZATION PROJECT
CUPERTINO, CALIFORNIA

FIGURE

3

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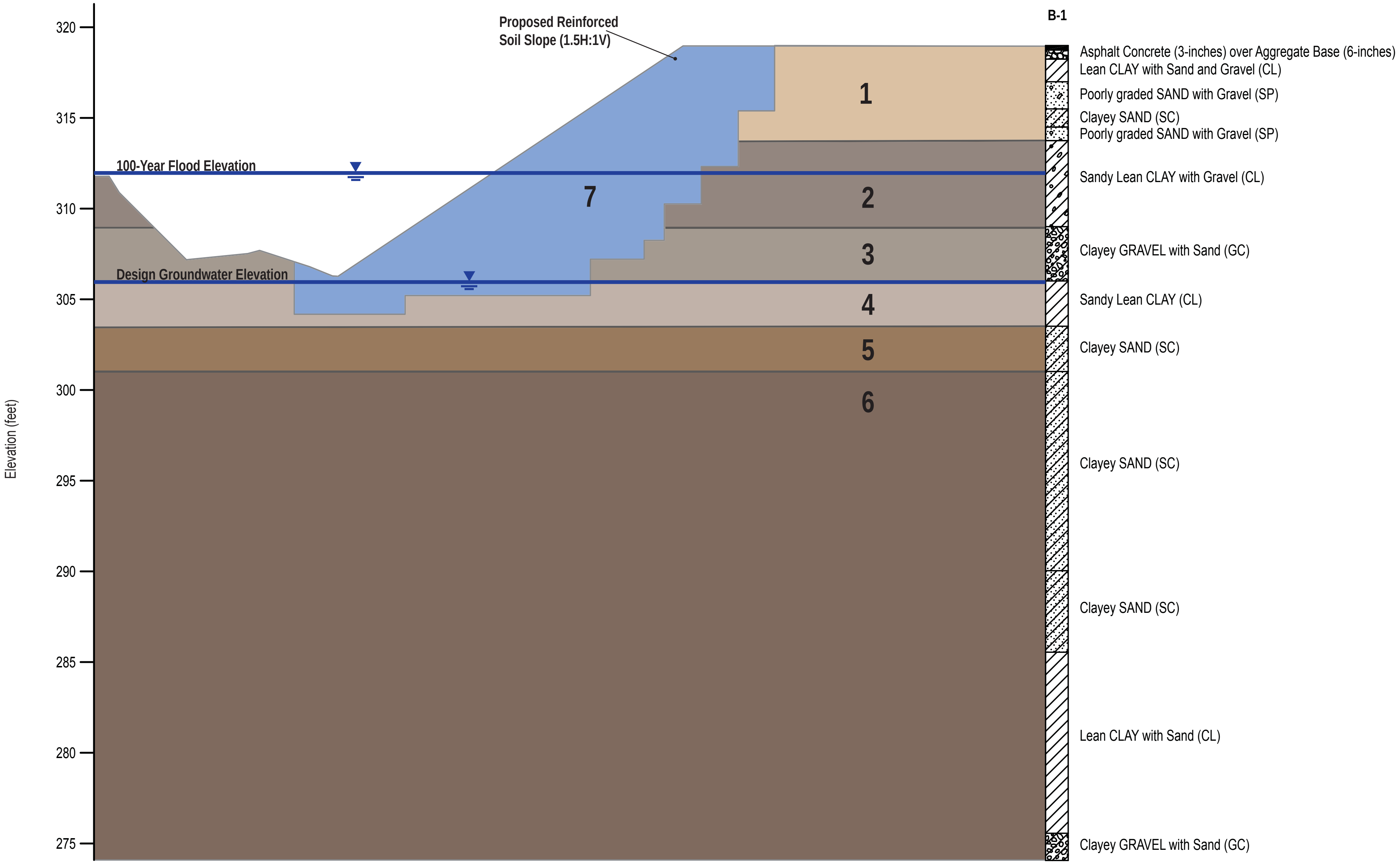
Cross Section SL-8


Proposed Reinforced
Soil Slope (1.5H:1V)
100-Year Flood Elevation
Design Groundwater Elevation
Elevation (feet)
320
315
310
305
300
295
290
285
280
275
1
2
3
4
5
6
7
B-1
Asphalt Concrete (3-inches) over Aggregate Base (6-inches)
Lean CLAY with Sand and Gravel (CL)
Poorly graded SAND with Gravel (SP)
Clayey SAND (SC)
Poorly graded SAND with Gravel (SP)
Sandy Lean CLAY with Gravel (CL)
Clayey GRAVEL with Sand (GC)
Sandy Lean CLAY (CL)
Clayey SAND (SC)
Clayey SAND (SC)
Clayey SAND (SC)
Lean CLAY with Sand (CL)
Clayey GRAVEL with Sand (GC)

1 **Lean Clay with Sand and Gravel / Clayey Sand**
γ: 125 pcf
φ': 30°
c': 50 psf
EFP_a: 45 pcf
EFP_p: 250 pcf

2 **Sandy Lean Clay with Gravel**
γ: 125 pcf
φ': 30°
c': 250 psf
EFP_a: 45 pcf
EFP_p: 250 pcf

3 **Clayey Gravel with Sand**
γ: 125 pcf
φ': 36°
c': 0 psf
EFP_a: 45 pcf
EFP_p: 250 pcf

4 **Sandy Lean Clay**
γ: 125 pcf
φ': 30°
c': 100 psf
EFP_a: 85 pcf
EFP_p: 275 pcf

5 **Clayey Sand**
γ: 125 pcf
φ': 32°
c': 100 psf
EFP_a: 85 pcf
EFP_p: 275 pcf

6 **Clayey Sand (lower)**
γ: 125 pcf
φ': 36°
c': 50 psf
EFP_a: 85 pcf
EFP_p: 275 pcf

7 **Engineered Fill**
γ: 130 pcf
φ': 32°
c': 50 psf

Oakland

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Note:
EFP = Equivalent Fluid Pressure

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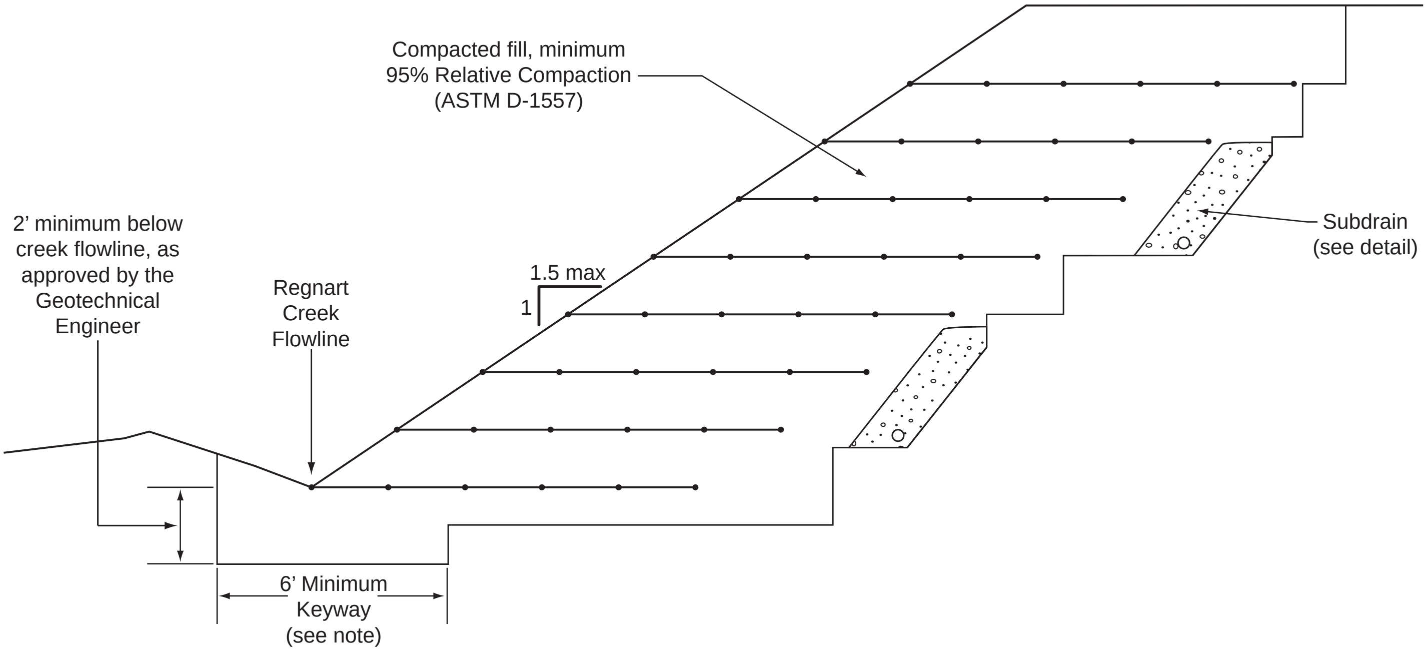
SOIL PROFILE AND GEOTECHNICAL DESIGN PARAMETERS

REGNART CREEK BANK STABILIZATION PROJECT
CUPERTINO, CALIFORNIA

FIGURE
4



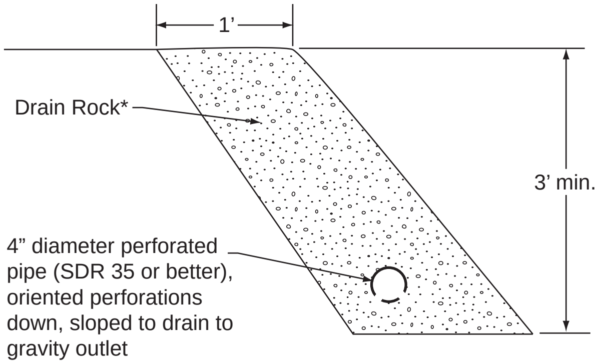
	Reinforcement Type[1]	Symbol	Embedment Length	Vertical Spacing
Primary Reinforcement	Tensar UX1100HS	•—•—•—•	10'	1.5'

[1] Or approved equivalent

[2] Surface and toe erosion protection design by others

REINFORCED SOIL SLOPE DETAIL

(not to scale)



SUBDRAIN DETAIL

(not to scale)

*Drain rock should be clean, free draining and meet the requirements for Class 2 permeable material Section 68 of State of California "Caltrans" Standard Specifications, or 0.75" diameter crushed rock encapsulated in filter fabric, such as Mirafi 140n

ILLUSTRATOR FILE: U:\GEOTECH_PROJECTS\Projects\Active\20150225

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Santa Rosa

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PROJECT NO.	20150225
DRAWN	FEB 2016
DRAWN BY	EGJ
CHECKED BY	MDF
FILE NAME	RSS and Drainage Detail.ai

REINFORCED SOIL SLOPE AND DRAINAGE DETAIL

REGNART CREEK STABILIZATION PROJECT
CUPERTINO, CALIFORNIA

FIGURE
5

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Appendix A

SAMPLE/SAMPLER TYPE GRAPHICS

☒	BULK SAMPLE
■	CALIFORNIA-TYPE SAMPLER
◪	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

▽	WATER LEVEL (level where first observed)
▼	WATER LEVEL (level after exploration completion)
▼	WATER LEVEL (additional levels after exploration)
≋	OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu≥4 and 1≤Cc≤3	**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu<4 and/ or 1>Cc>3	**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu≥4 and 1≤Cc≤3	**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu<4 and/ or 1>Cc>3	**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES		**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu≥6 and 1≤Cc≤3	**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu<6 and/ or 1>Cc>3	**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu≥6 and 1≤Cc≤3	**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu<6 and/ or 1>Cc>3	**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES		**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit greater than 50)	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

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PROJECT NO.:	20150225
DRAWN BY:	EGJ
CHECKED BY:	MDF
DATE:	2/24/2016
REVISED:	-

GRAPHICS KEY

Regnart Creek Bank Stabilization Project
Cupertino, California

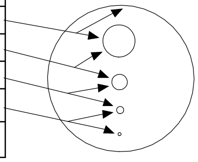
FIGURE
A-1

PLOTTED: 02/23/2016 05:27 PM BY: EJohnson

gINT FILE: U:\geotech_projects\projects\active\20150225.006a Regnart Creek\gint\boring Log.gpj
gINT TEMPLATE: PROJECTWISE: KLF_STANDARD_GINT_LIBRARY_2016.GLB [GEO-LEGEND 2 (SOIL DESCRIPTION KEY)]

GRAIN SIZE

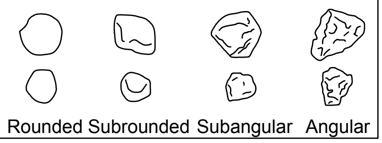
DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



Munsell Color

NAME	ABBR
Red	R
Yellow Red	YR
Yellow	Y
Green Yellow	GY
Green	G
Blue Green	BG
Blue	B
Purple Blue	PB
Purple	P
Red Purple	RP
Black	N

ANGULARITY

DESCRIPTION	CRITERIA	
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces	
Subangular	Particles are similar to angular description but have rounded edges	
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges	
Rounded	Particles have smoothly curved sides and no edges	

Particles Present

Amount	Percentage
trace	<5
few	5-10
little	15-25
some	30-45
and	50
mostly	50-100

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

NOTE: AFTER TERZAGHI AND PECK, 1948

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (q_u)(psf)	CRITERIA
Very Soft	< 1000	Thumb will penetrate soil more than 1 in. (25 mm.)
Soft	1000 - 2000	Thumb will penetrate soil about 1 in. (25 mm.)
Firm	2000 - 4000	Thumb will indent soil about 1/4-in. (6 mm.)
Hard	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail
Very Hard	> 8000	Thumbnail will not indent soil

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

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PROJECT NO.:	20150225	SOIL DESCRIPTION KEY	FIGURE
DRAWN BY:	EGJ		A-2
CHECKED BY:	MDF	Regnart Creek Bank Stabilization Project Cupertino, California	
DATE:	2/24/2016		
REVISED:	-		

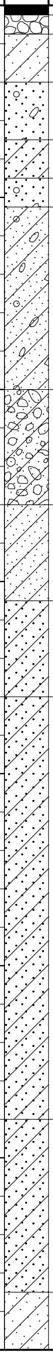
BORING LOG B-1

Date Begin - End: 1/08/2016
Logged By: B. Hasseler
Hor.-Vert. Datum: WGS84 - Assumed Elevatio
Plunge: -90 degrees
Weather: Clear
Drilling Company: Pitcher Drilling
Drill Crew: Eden, Connor
Drilling Equipment: Failing 1500
Drilling Method: Solid Flight Auger / Mud Rotary
Bore Diameter: 3.88 in. O.D.
Hammer Type - Drop: 140 lb. Auto - 30 in.

FIELD EXPLORATION

Latitude: 37.30901° N
Longitude: -122.04317° E
Approximate Ground Surface Elevation (ft.): 319.00
Surface Condition: Asphalt

LABORATORY RESULTS



Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		3-inches **ASPHALT CONCRETE**											Solid Flight Auger, 0' to 20'
		6-inches **AGGREGATE BASE**											
		Lean CLAY with Sand and Gravel (CL): reddish brown, moist, firm, fine to coarse sand, fine gravel	☒										
315		**Poorly graded SAND with Gravel (SP)**: reddish brown, moist, fine sand, fine gravel	☒			SC	12.1		94	40	25	9	
	5	**Clayey SAND (SC)**: reddish brown, moist, fine sand	☒ ☒										
		Poorly graded SAND with Gravel (SP): reddish brown, moist, fine to coarse sand, fine gravel	☒										
		Sandy Lean CLAY with Gravel (CL): reddish brown, moist, firm to hard, trace fine sand, fine to coarse gravel	■	BC=11 17 26 PP=>4.5	17"		13.6	115.1			39	23	S_u= 4.1 KSF (TXUU)
310			■	BC=8 14 17 PP=>4.5	16"		13.7	116.2			38	22	
	10	**Clayey GRAVEL with Sand (GC)**: yellowish brown, moist, very dense, fine to coarse sand, fine to coarse gravel	◣	BC=14 21 35	18"								
305		**Sandy Lean CLAY (CL)**: reddish brown, moist, hard, fine sand	◣	BC=10 11 15 PP=>4.5	18"	CL	11.9		97	59	30	15	
	15	**Clayey SAND (SC)**: yellowish brown, moist, very dense, fine to coarse sand, with trace fine to coarse gravel	■	BC=15 30 50 PP=>4.5	15"		10.1	119.9	89	39			
300	20	**Clayey SAND (SC)**: yellowish brown to reddish brown, moist, dense, fine to coarse sand, with trace fine to coarse gravel	◣	BC=8 14 20	18"	SC	18.5		93	44	30	13	Mud Rotary, 20' to 45'
295			■	BC=34 50	6"								
	25	becomes very dense, decreasing clay content											
290	30	**Clayey SAND (SC)**: yellowish brown, moist, medium dense, fine grained	◣	BC=10 11 14	18"								
285		**Lean CLAY with Sand (CL)**: reddish brown, moist, hard	■	BC=15 29 41	12"		15.7	118.6			31	16	S_u= 5.6 KSF (TXUU)

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PROJECT NO.: 20150225
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DATE: 1/15/2016
REVISED: -

BORING LOG B-1

Regnart Creek Bank Stabilization Project
Cupertino, California

FIGURE
A-3

PLOTTED: 02/23/2016 05:22 PM BY: EJohnson

BORING LOG B-1

Date Begin - End: 1/08/2016
Drilling Company: Pitcher Drilling
Logged By: B. Hasseler
Drill Crew: Eden, Connor
Hor.-Vert. Datum: WGS84 - Assumed Elevatio
Drilling Equipment: Failing 1500
Hammer Type - Drop: 140 lb. Auto - 30 in.
Plunge: -90 degrees
Drilling Method: Solid Flight Auger / Mud Rotary
Weather: Clear
Bore Diameter: 3.88 in. O.D.

			FIELD EXPLORATION				LABORATORY RESULTS							
Approximate Elevation (feet)	Depth (feet)	Graphical Log	Latitude: 37.30901° N Longitude: -122.04317° E Approximate Ground Surface Elevation (ft.): 319.00 Surface Condition: Asphalt Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		▨	**Lean CLAY with Sand (CL)**: reddish brown, moist, hard		PP=>4.5									
280		▨		◣	BC=8 7 8	18"								
	40	▨	becomes firm		PP=2.75									
275		▨	**Clayey GRAVEL with Sand (GC)**: reddish brown, moist, very dense, fine to coarse sand, fine to coarse gravel	■	BC=25 35 46	12"								
	45													
270	50													
265	55													
260	60													
255	65													
250														

The boring was terminated at approximately 45 ft. below ground surface. The boring was backfilled with grout on January 08, 2016.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered at a depth above 20' during drilling.

GENERAL NOTES:
1. Pavement repaired with hot-mix asphalt concrete patch.
2. The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE: 1/15/2016
REVISED: -

BORING LOG B-1

Regnart Creek Bank Stabilization Project
Cupertino, California

FIGURE
A-3

PAGE: 2 of 2

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gINT TEMPLATE: PROJECTWISE: KLF_STANDARD_GINT_LIBRARY_2016.GLB [KLF_BORING/TEST PIT SOIL LOG]

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Appendix B

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
B-1	3.5	CLAYEY SAND (SC)	12.1		100	94	40	25	16	9	
B-1	6.5	SANDY LEAN CLAY WITH GRAVEL (CL)	13.6	115.1				39	16	23	S_u= 4.1 KSF (TXUU)
B-1	8.5	SANDY LEAN CLAY WITH GRAVEL (CL)	13.7	116.2				38	16	22	
B-1	12.5	SANDY LEAN CLAY (CL)	11.9			97	59	30	15	15	
B-1	15.5	CLAYEY SAND (SC)	10.1	119.9	100	89	39				
B-1	18.5	CLAYEY SAND (SC)	18.5		100	93	44	30	17	13	
B-1	34.5	LEAN CLAY WITH SAND (CL)	15.7	118.6				31	15	16	S_u= 5.6 KSF (TXUU)

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic

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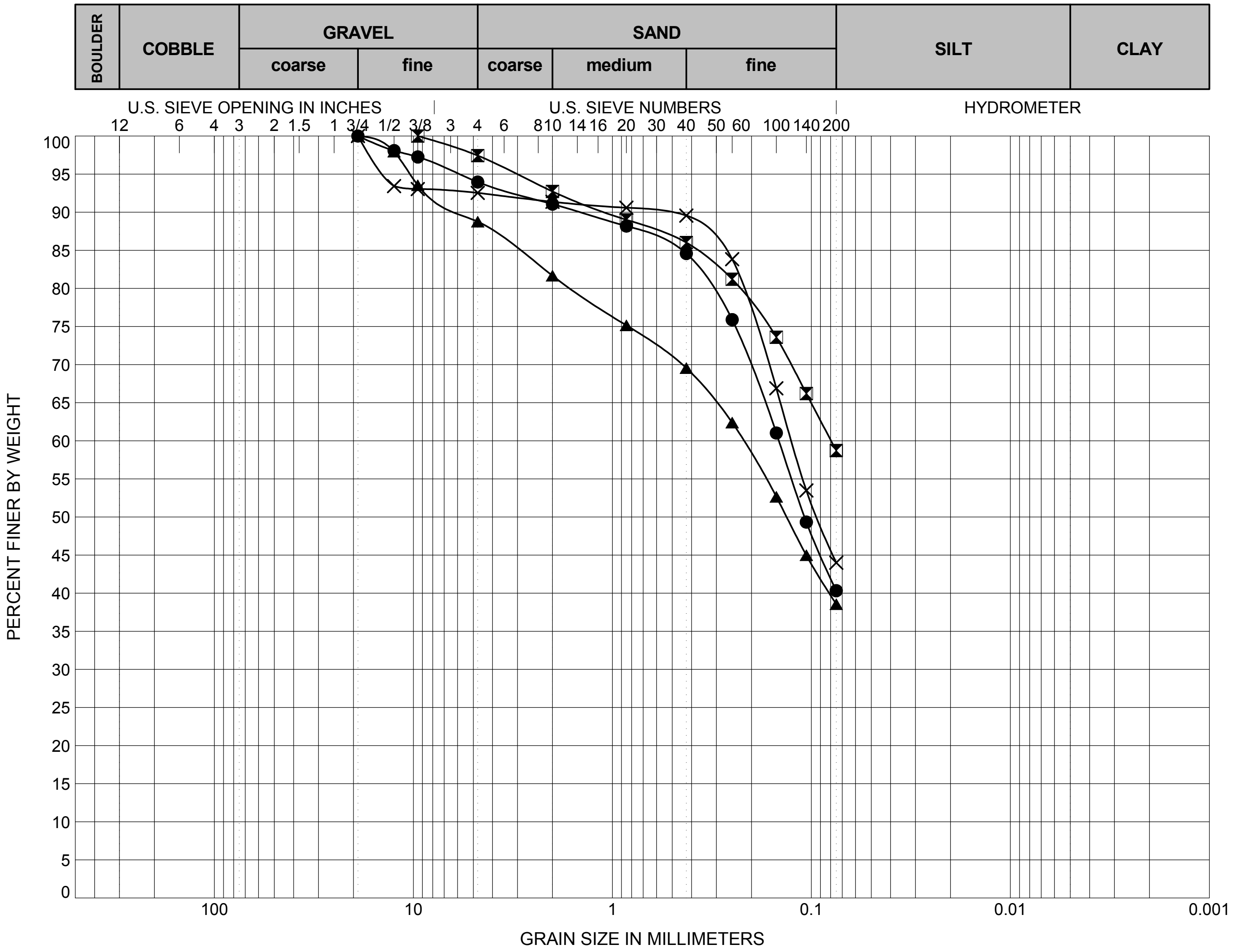
DATE: 2/24/2016
REVISED: -

LABORATORY TEST
RESULT SUMMARY

Regnart Creek Bank Stabilization Project
Cupertino, California

FIGURE
B-1



	Exploration ID	Depth (ft.)	Sample Description	LL	PL	PI
●	B-1	3.5	CLAYEY SAND (SC)	25	16	9
⧗	B-1	12.5	SANDY LEAN CLAY (CL)	30	15	15
▲	B-1	15.5	CLAYEY SAND (SC)	NM	NM	NM
×	B-1	18.5	CLAYEY SAND (SC)	30	17	13

	Exploration ID	Depth (ft.)	D_{100}	D_{60}	D_{30}	D_{10}	Cc	Cu	Passing 3/4"	Passing #4	Passing #200	%Silt	%Clay
●	B-1	3.5	19	0.146	NM	NM	NM	NM	100	94	40	NM	NM
⧗	B-1	12.5	9.5	0.08	NM	NM	NM	NM		97	59	NM	NM
▲	B-1	15.5	19	0.221	NM	NM	NM	NM	100	89	39	NM	NM
×	B-1	18.5	19	0.126	NM	NM	NM	NM	100	93	44	NM	NM

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
Coefficients of Curvature - $C_C = (D_{30})^2 / D_{60} D_{10}$
D_{60} = Grain diameter at 60% passing
D_{30} = Grain diameter at 30% passing
D_{10} = Grain diameter at 10% passing

Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D422.
NP = Nonplastic
NM = Not Measured

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DATE: 1/15/2016
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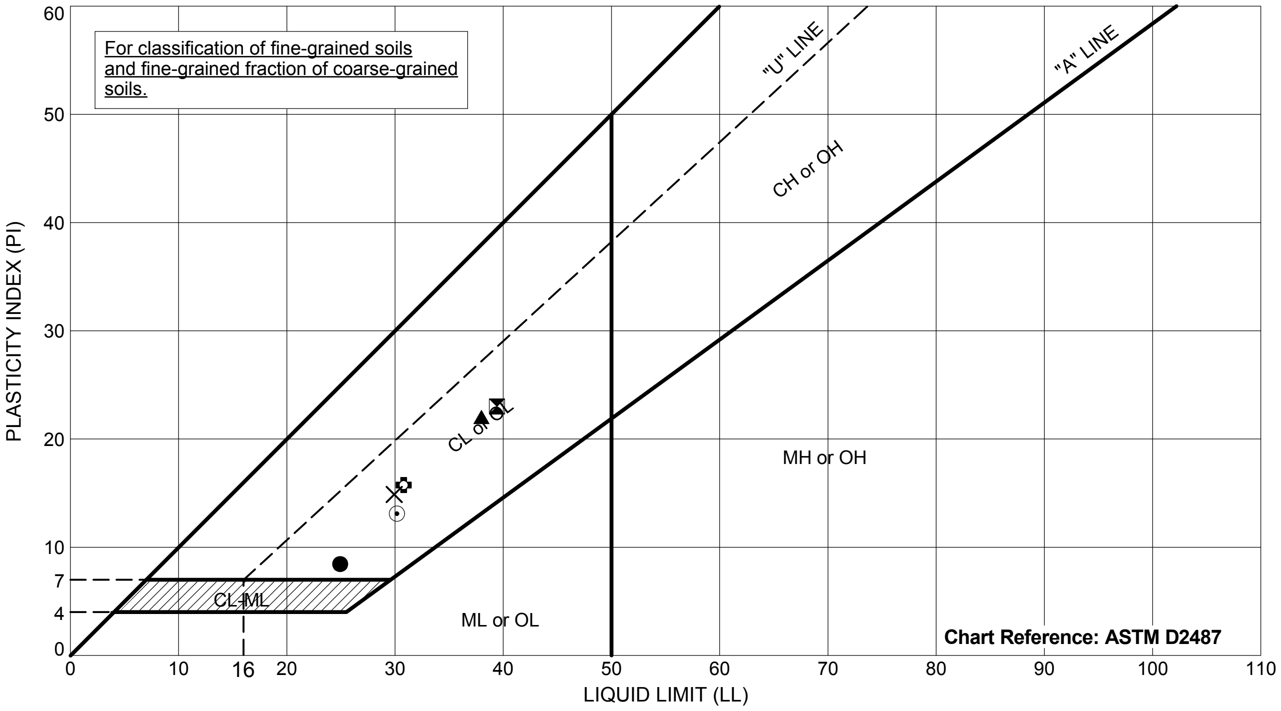
SIEVE ANALYSIS

Regnart Creek Bank Stabilization Project
Cupertino, California

B-2



	Exploration ID	Depth (ft.)	Sample Description	Passing #200	LL	PL	PI
●	B-1	3.5	CLAYEY SAND (SC)	40	25	16	9
⧖	B-1	6.5	SANDY LEAN CLAY WITH GRAVEL (CL)	NM	39	16	23
▲	B-1	8.5	SANDY LEAN CLAY WITH GRAVEL (CL)	NM	38	16	22
×	B-1	12.5	SANDY LEAN CLAY (CL)	59	30	15	15
⊙	B-1	18.5	CLAYEY SAND (SC)	44	30	17	13
✿	B-1	34.5	LEAN CLAY WITH SAND (CL)	NM	31	15	16

Testing perfomed in general accordance with ASTM D4318.
NP = Nonplastic
NM = Not Measured

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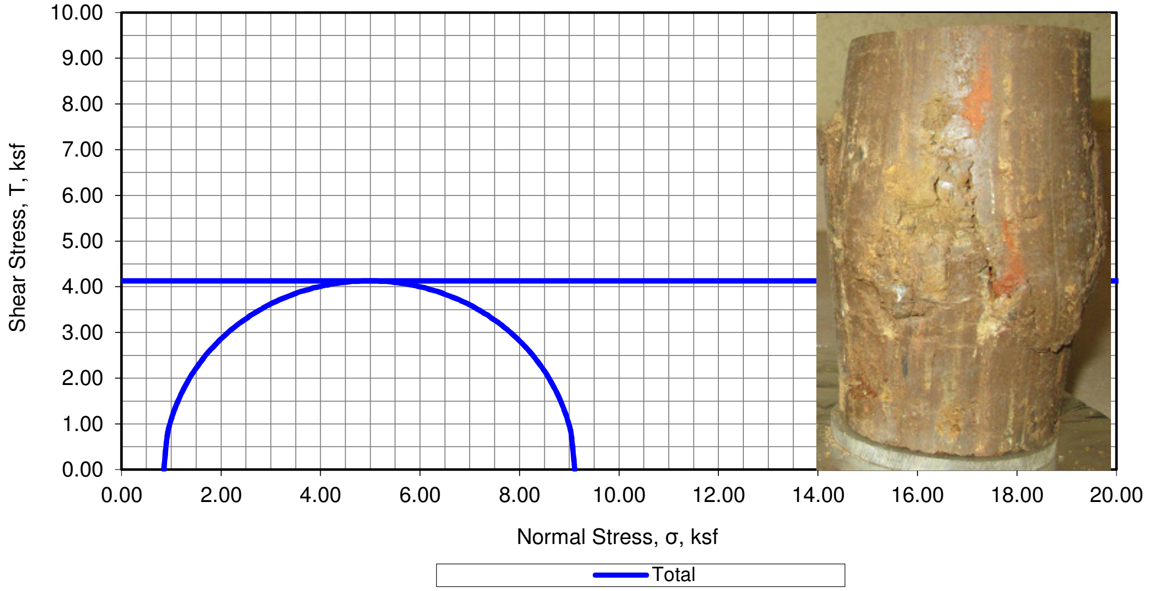
PROJECT NO.: 20150225
DRAWN BY: EGJ
CHECKED BY:
DATE: 1/15/2016
REVISED: -

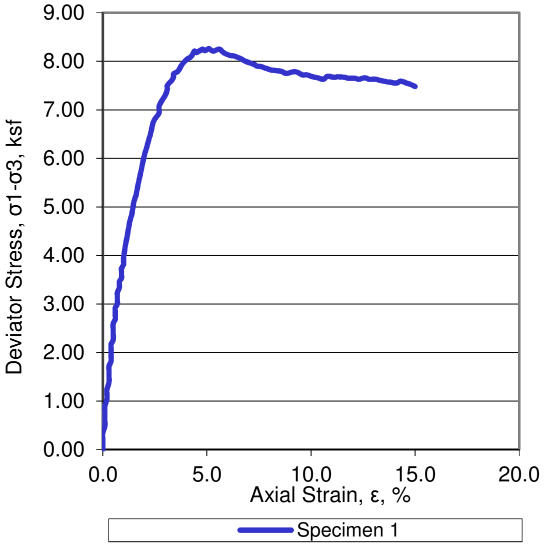
ATTERBERG LIMITS

Regnart Creek Bank Stabilization Project
Cupertino, California

B-3

Total	
c = 4.13	ksf





Specimen No.			1
Initial	Diameter, in	D_O	2.39
	Height, in	H_O	5.33
	Water Content, %	ω_O	13.6
	Dry Density, lbs/ft^3	γ_{d_o}	115.1
	Saturation, %	S_O	83
	Void Ratio	e_O	0.436
Minor Principal Stress, ksf		σ_3	0.85
Maximum Deviator Stress, ksf		$(\sigma1-\sigma3)_{max}$	8.26
Time to $(\sigma_1-\sigma_3)_{max}$, min		t_f	5.07
Deviator Stress @ 15% Axial Strain, ksf		$(\sigma_1-\sigma_3)_{15\%}$	7.48
Ultimate Deviator Stress, ksf		$(\sigma_1-\sigma_3)_{ult}$	na
Rate of strain, %/min		$'\varepsilon$	1.00
Axial Strain at Failure, %		ε_f	5.07

Description of Specimen: Sandy Lean Clay with Gravel (CL)

Amount of Material Finer than the No. 200, %: nm

LL: 39 | PL: 16 | PI: 23 | G_S: 2.65 Assumed | Specimen Type: Undisturbed | Test Method: ASTM D2850

Membrane correction applied

Boring:	B-1
Sample:	1-7-1
Depth, ft:	6.5
Test Date:	1/11/16

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.
2601 Barrington Ct, Hayward, CA 94545

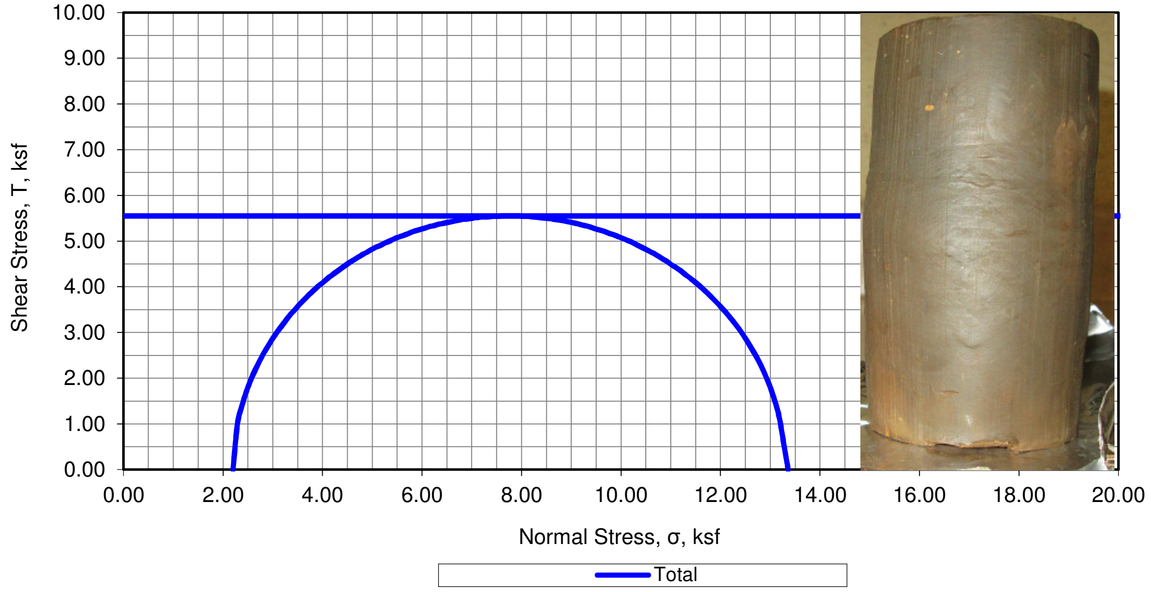
Project No.:	20150225
Date:	1/18/16
Entry By:	CP
Checked By:	CP
File Name:	HL8527

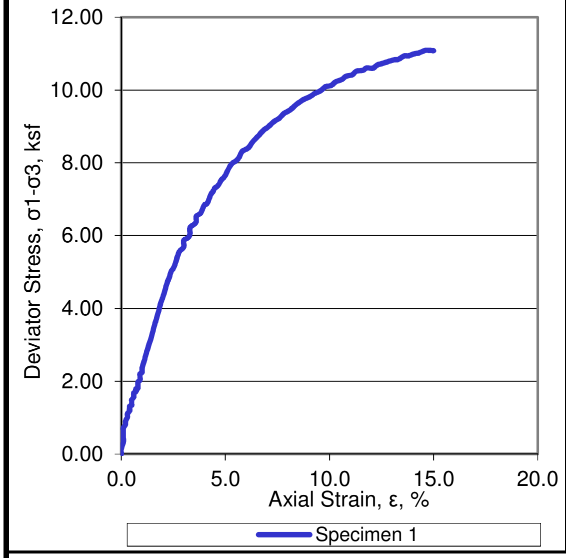
TRIAXIAL COMPRESSION TEST (UU)

REGNART CREEK BANK
STABALIZATION PROJECT
CUPERTINO, CALIFORNIA

Figure
1 of 1
B-4

Total	
c = 5.55	ksf





Specimen No.			1
Initial	Diameter, in	D_O	2.39
	Height, in	H_O	5.59
	Water Content, %	ω_O	15.7
	Dry Density, lbs/ft^3	γd_o	118.6
	Saturation, %	S_O	106
	Void Ratio	e_O	0.394
Minor Principal Stress, ksf		σ_3	2.20
Maximum Deviator Stress, ksf		$(\sigma1-\sigma3)_{max}$	11.09
Time to $(\sigma_1-\sigma_3)_{max}$, min		t_f	14.85
Deviator Stress @ 15% Axial Strain, ksf		$(\sigma_1-\sigma_3)_{15\%}$	11.08
Ultimate Deviator Stress, ksf		$(\sigma_1-\sigma_3)_{ult}$	na
Rate of strain, %/min		'ε	1.00
Axial Strain at Failure, %		ε_f	14.85

Description of Specimen: Lean Clay with Sand (CL)

Amount of Material Finer than the No. 200, %: nm

LL: 31	PL: 15	PI: 16	G_S: 2.65 Assumed	Specimen Type: Undisturbed	Test Method: ASTM D2850

Membrane correction applied

Boring:	B-1
Sample:	1-15-1
Depth, ft:	34.5
Test Date:	1/11/16

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.
2601 Barrington Ct, Hayward, CA 94545

Project No.:	20150225
Date:	1/18/16
Entry By:	CP
Checked By:	CP
File Name:	HL8527

TRIAXIAL COMPRESSION TEST (UU)

REGNART CREEK BANK STABALIZATION PROJECT CUPERTINO, CALIFORNIA

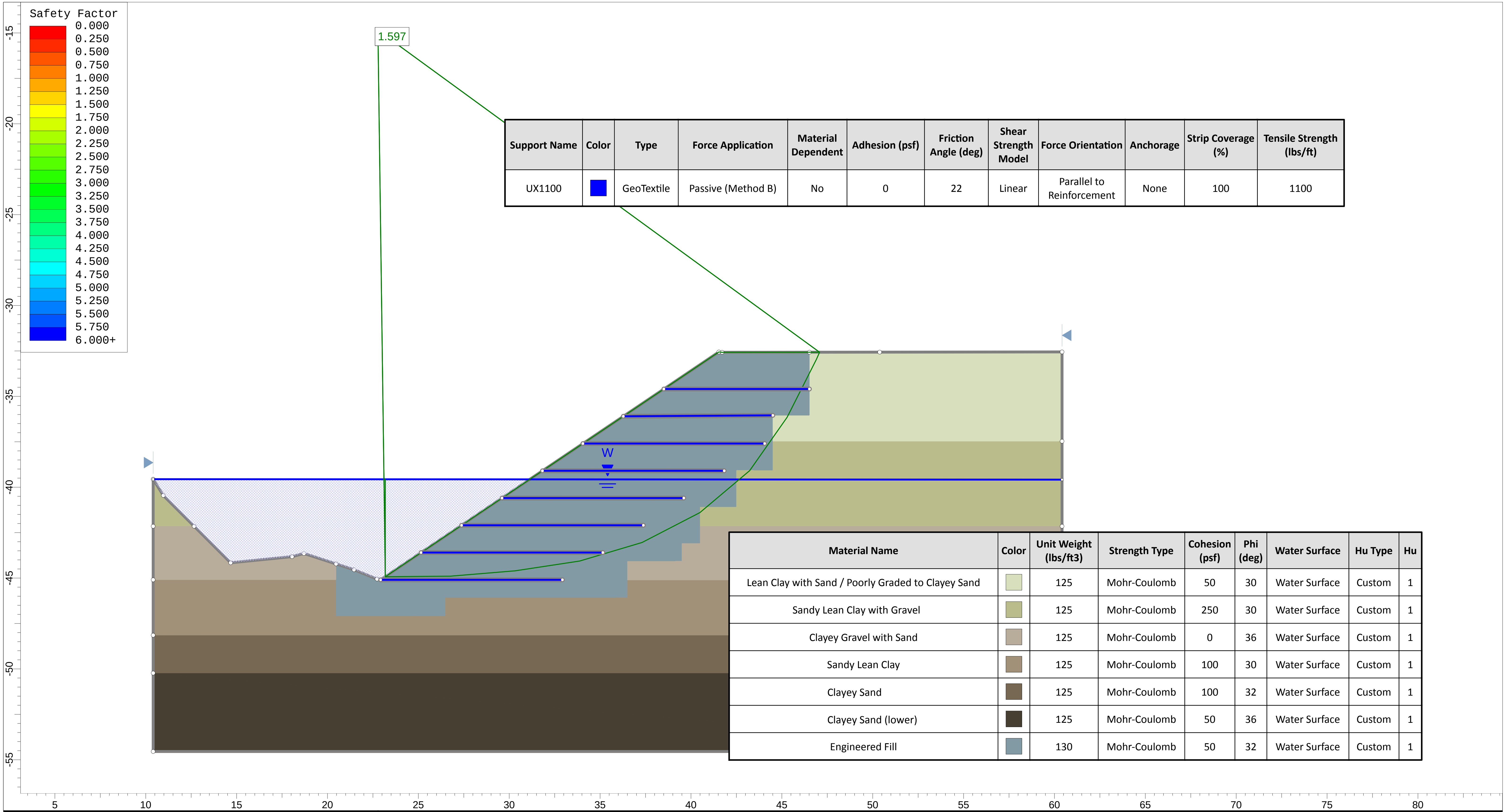
Figure

1 of 1

B-5

KLEINFELDER
Bright People. Right Solutions.

Appendix C

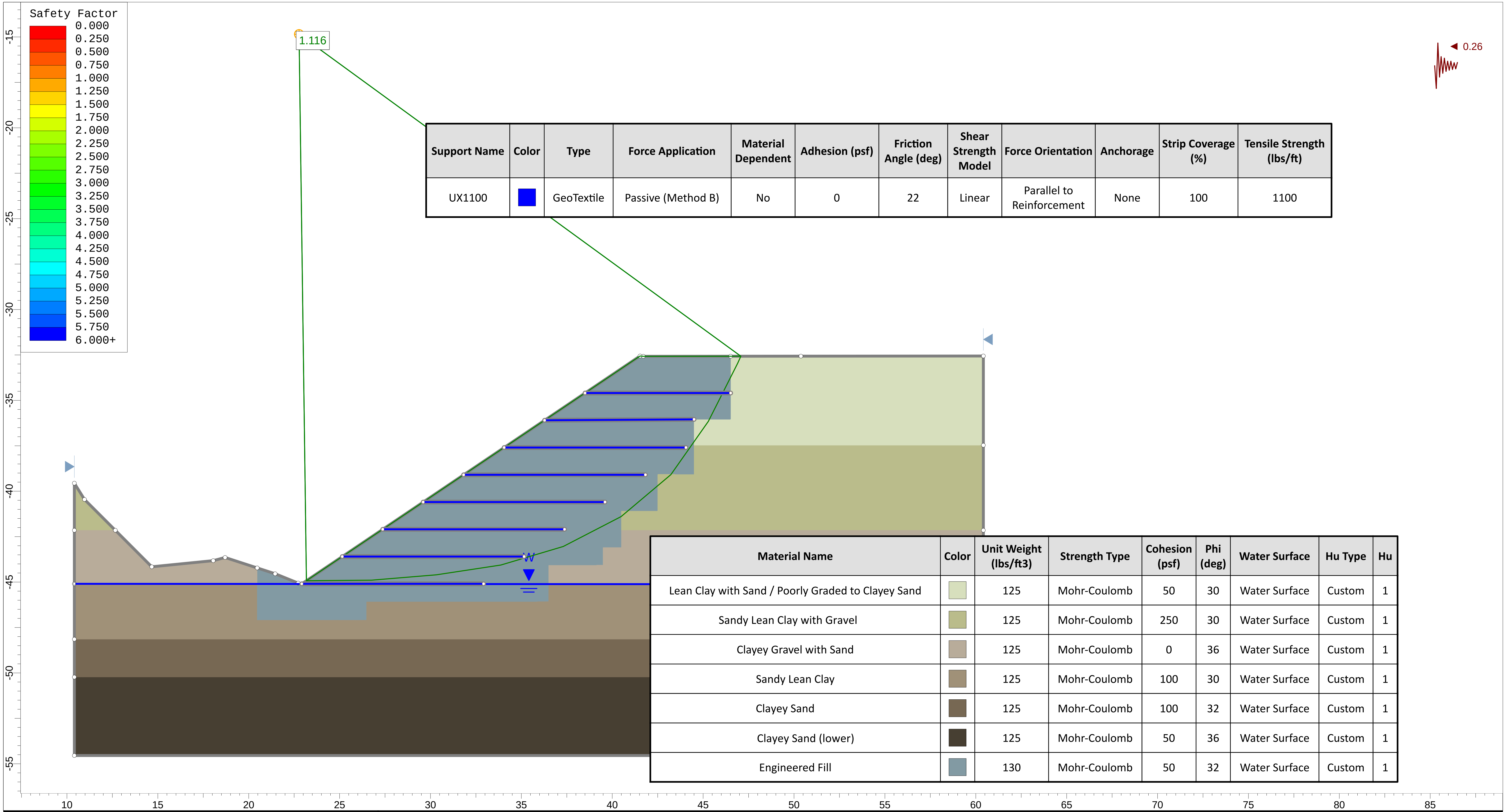


Support Name	Color	Type	Force Application	Material Dependent	Adhesion (psf)	Friction Angle (deg)	Shear Strength Model	Force Orientation	Anchorage	Strip Coverage (%)	Tensile Strength (lbs/ft)
UX1100	🟦	GeoTextile	Passive (Method B)	No	0	22	Linear	Parallel to Reinforcement	None	100	1100

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
Lean Clay with Sand / Poorly Graded to Clayey Sand	■	125	Mohr-Coulomb	50	30	Water Surface	Custom	1
Sandy Lean Clay with Gravel	■	125	Mohr-Coulomb	250	30	Water Surface	Custom	1
Clayey Gravel with Sand	■	125	Mohr-Coulomb	0	36	Water Surface	Custom	1
Sandy Lean Clay	■	125	Mohr-Coulomb	100	30	Water Surface	Custom	1
Clayey Sand	■	125	Mohr-Coulomb	100	32	Water Surface	Custom	1
Clayey Sand (lower)	■	125	Mohr-Coulomb	50	36	Water Surface	Custom	1
Engineered Fill	■	130	Mohr-Coulomb	50	32	Water Surface	Custom	1

Project	SCVWD - Regnart Creek
Analysis Description	Static Conditions
Drawn By	E. Johnson
Scale	1:60
Company	Kleinfelder
Date	2/8/2016, 11:28:33 AM
File Name	SL-8 RSS UX1100 Static.slim

SLIDEINTERPRET 6.029

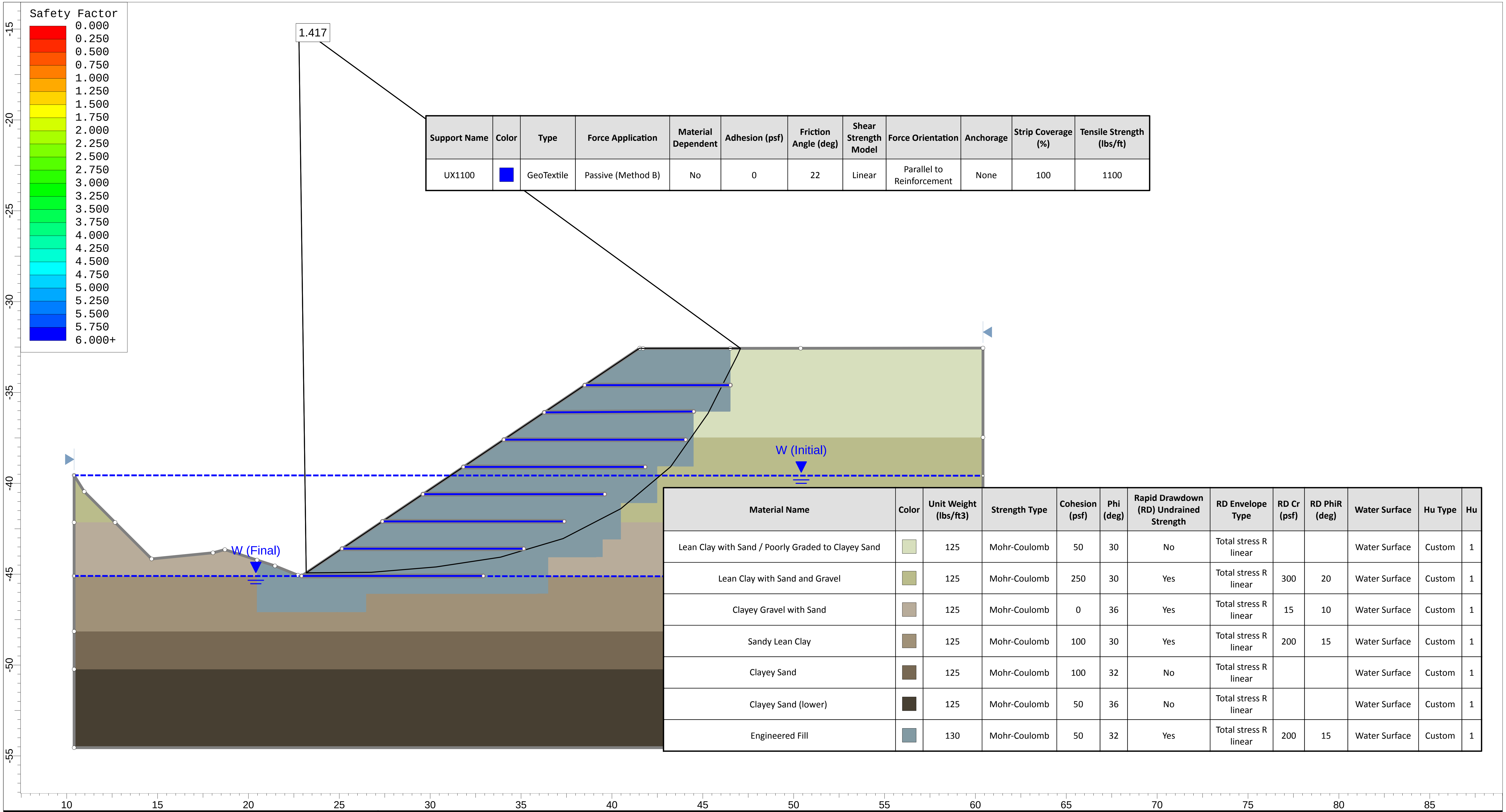


Support Name	Color	Type	Force Application	Material Dependent	Adhesion (psf)	Friction Angle (deg)	Shear Strength Model	Force Orientation	Anchorage	Strip Coverage (%)	Tensile Strength (lbs/ft)
UX1100	🟦	GeoTextile	Passive (Method B)	No	0	22	Linear	Parallel to Reinforcement	None	100	1100

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
Lean Clay with Sand / Poorly Graded to Clayey Sand	▨	125	Mohr-Coulomb	50	30	Water Surface	Custom	1
Sandy Lean Clay with Gravel	▨	125	Mohr-Coulomb	250	30	Water Surface	Custom	1
Clayey Gravel with Sand	▨	125	Mohr-Coulomb	0	36	Water Surface	Custom	1
Sandy Lean Clay	▨	125	Mohr-Coulomb	100	30	Water Surface	Custom	1
Clayey Sand	▨	125	Mohr-Coulomb	100	32	Water Surface	Custom	1
Clayey Sand (lower)	▨	125	Mohr-Coulomb	50	36	Water Surface	Custom	1
Engineered Fill	▨	130	Mohr-Coulomb	50	32	Water Surface	Custom	1

Project	SCVWD - Regnart Creek		
Analysis Description	Seismic (Pseudostatic Conditions)		
Drawn By	E. Johnson	*Scale*	1:60
Company	Kleinfelder		
Date	2/8/2016, 11:28:33 AM	*File Name*	SL-8 RSS UX1100 Seismic.slim

SLIDEINTERPRET 6.029



Support Name	Color	Type	Force Application	Material Dependent	Adhesion (psf)	Friction Angle (deg)	Shear Strength Model	Force Orientation	Anchorage	Strip Coverage (%)	Tensile Strength (lbs/ft)
UX1100	🟦	GeoTextile	Passive (Method B)	No	0	22	Linear	Parallel to Reinforcement	None	100	1100

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Rapid Drawdown (RD) Undrained Strength	RD Envelope Type	RD Cr (psf)	RD PhiR (deg)	Water Surface	Hu Type	Hu
Lean Clay with Sand / Poorly Graded to Clayey Sand	■	125	Mohr-Coulomb	50	30	No	Total stress R linear			Water Surface	Custom	1
Lean Clay with Sand and Gravel	■	125	Mohr-Coulomb	250	30	Yes	Total stress R linear	300	20	Water Surface	Custom	1
Clayey Gravel with Sand	■	125	Mohr-Coulomb	0	36	Yes	Total stress R linear	15	10	Water Surface	Custom	1
Sandy Lean Clay	■	125	Mohr-Coulomb	100	30	Yes	Total stress R linear	200	15	Water Surface	Custom	1
Clayey Sand	■	125	Mohr-Coulomb	100	32	No	Total stress R linear			Water Surface	Custom	1
Clayey Sand (lower)	■	125	Mohr-Coulomb	50	36	No	Total stress R linear			Water Surface	Custom	1
Engineered Fill	■	130	Mohr-Coulomb	50	32	Yes	Total stress R linear	200	15	Water Surface	Custom	1

SLIDEINTERPRET 6.029

Project	SCVWD - Regnart Creek
Analysis Description	Rapid Drawdown Conditions
Drawn By	E. Johnson
Scale	1:60
Company	Kleinfelder
Date	2/8/2016, 11:28:33 AM
File Name	SL-8 RSS UX1100 RDD.slim